

# Inductive Coupler for Downhole Components and Method for Making Same

## Abstract

The present invention includes a method of making an inductive coupler for downhole components. The method includes providing an annular housing, preferably made of steel, the housing having a recess. A conductor, preferably an insulated wire, is also provided along with a plurality of generally U-shaped magnetically conducting, electrically insulating (MCEI) segments. Preferably, the MCEI segments comprise ferrite. An assembly is formed by placing the plurality of MCEI segments within the recess in the annular housing. The segments are aligned to form a generally circular trough. A first portion of the conductor is placed within the circular trough. This assembly is consolidated with a meltable polymer which fills spaces between the segments, annular housing and the first portion of the conductor. The invention also includes an inductive coupler including an annular housing having a recess defined by a bottom portion and two opposing side wall portions. At least one side wall portion includes a lip extending toward but not reaching the other side wall portion. A plurality of generally U-

shaped MCEI segments, preferably comprised of ferrite, are disposed in the recess and aligned so as to form a circular trough. The coupler further includes a conductor disposed within the circular trough and a polymer filling spaces between the segments, the annular housing and the conductor.